INSTALLATION MANUAL

R203

PRELIMINARY WARNINGS

The word **WARNING** preceded by the symbol ⚠ indicates conditions or actions that put the user's safety at risk.
The word **ATTENTION** preceded by the symbol ⚠ indicates conditions or actions that might damage the instrument or the connected equipment. The warranty shall become null and void in the event of improper use or tampering with the module or devices supplied by the manufacturer as necessary for its correct operation, and if the instructions contained in this manual are not followed.

	**WARNING**: The full content of this manual must be read before any operation. The module must only be used by qualified electricians. Specific documentation is available via QR-CODE shown on page 1.
	The module must be repaired and damaged parts replaced by the Manufacturer. The product is sensitive to electrostatic discharges. Take appropriate measures during any operation.
	Electrical and electronic waste disposal (applicable in the European Union and other countries with recycling). The symbol on the product or its packaging shows the product must be surrendered to a collection centre authorized to recycle electrical and electronic waste.

DOCUMENTATION
R203

SENECA

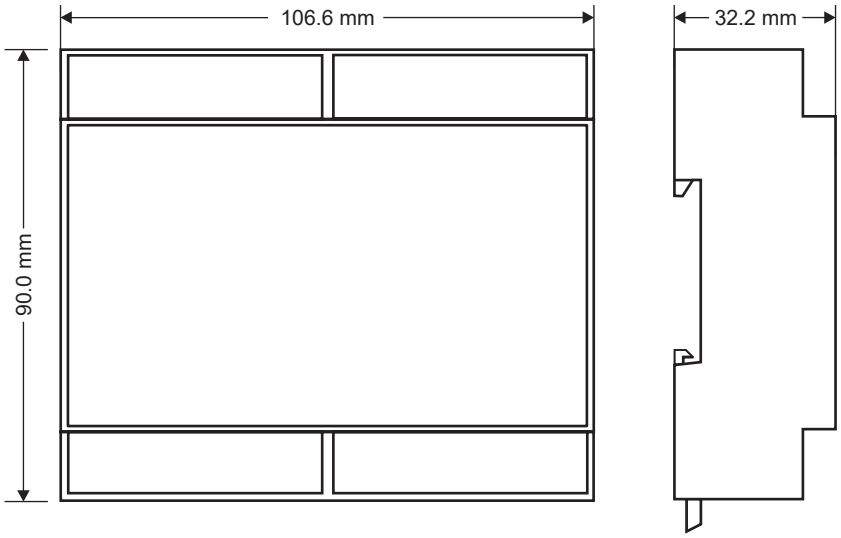
QUALITY MANAGEMENT SYSTEM
ISO 9001:2015

SENECA s.r.l.; Via Austria, 26 – 35127 – PADOVA – ITALY; Tel. +39.049.8705359 - Fax +39.049.8706287

CONTACT INFORMATION

Technical support	support@seneca.it	Product information	sales@seneca.it

MODULE LAYOUT

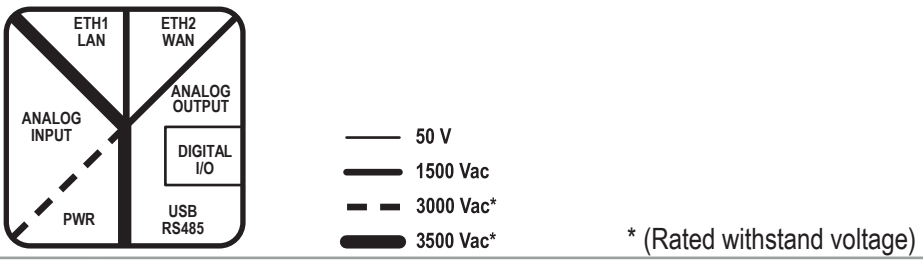


Weight: 170 g; **Enclosure:** UL94-V0 self-extinguishing PC/ABS material, black.

SIGNALS VIA LED ON FRONT PANEL

LED	STATUS	LED meaning
DO1	On	Output 01 activated
	Off	Output 01 deactivated
DO2	On	Output 02 activated
	Off	Output 02 deactivated
DI1	On	Input 01 activated
	Off	Input 01 deactivated
DI2	On	Input 02 activated
	Off	Input 02 deactivated
DATA LOGGER	ON	Data Logger function enabled
	Off	Data Logger function disabled
STS (Status)	On	Set IP address (powered module)
	Flashing	Waiting for the IP address from the DHCP (powered module)
WIRING ERROR	Flashing	Wiring error
	Off	Correct wiring
RX	On	RS485 connection anomaly
	Flashing	Reception of data packet completed on RS485
TX	Flashing	Transmission of data packet completed on RS485
ETH TRF (Yellow)	Flashing	Packet transit on Ethernet port
ETH LNK (Green)	Flashing	Ethernet port connected

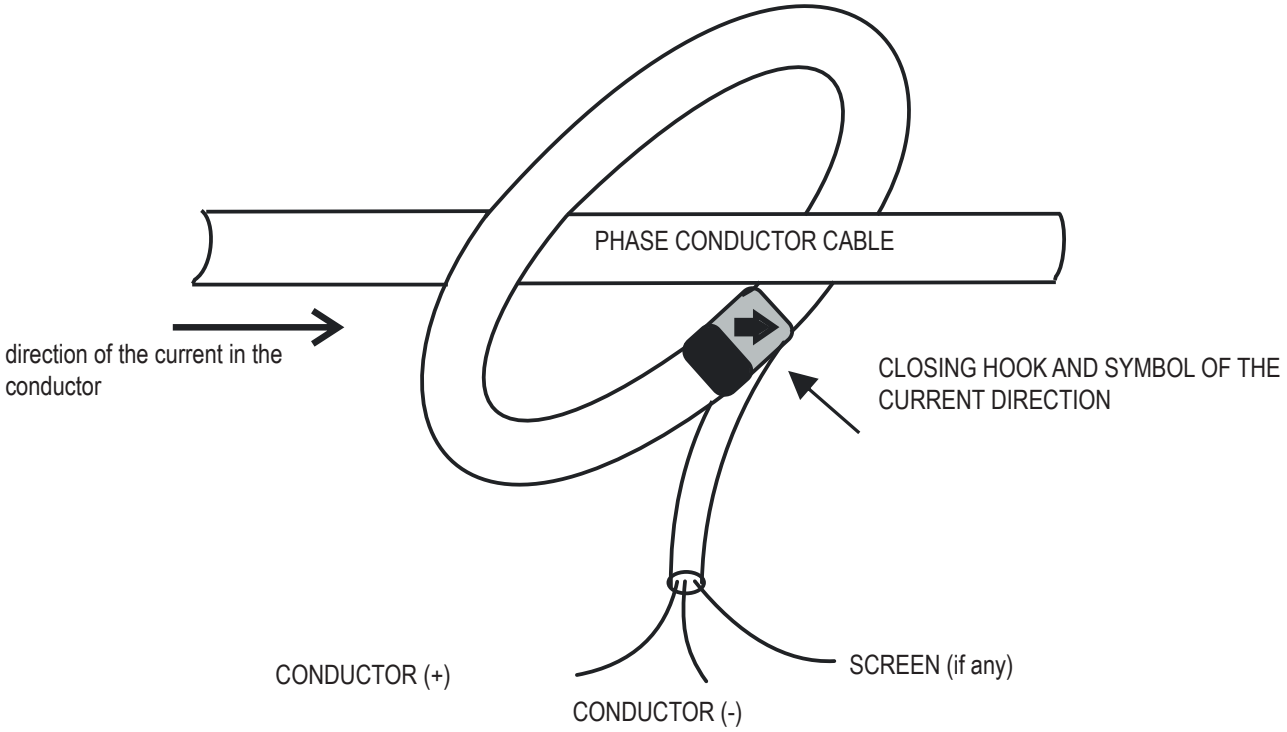
TECHNICAL SPECIFICATIONS

CERTIFICAZIONI	https://www.seneca.it/products/r203/doc/CE_declaration	
INSULATION	 * (Rated withstand voltage)	
ENVIRONMENTAL CONDITIONS	Temperature: -25°C ÷ +55°C Humidity: 30% ÷ 90% non condensing. Storage temperature: -30°C÷ + 85°C Degree of protection: IP20	
ASSEMBLY	DIN rail 35mm IEC EN60715, wall or panel with screws.	
CONNECTIONS	Screw terminals 5 mm, 7.5 mm and 3.5 mm pitch (RS485), cable with section <2.5 mm^2	
POWER SUPPLY	Voltage: 90 ÷ 264 Vac @ 50 ÷ 60 Hz, max. absorption 2.8 W, 5.4 VA	
COMMUNICATION PORTS	RS485: Baud rate: 1200 ÷ 115200 baud (for further information see the user manual). Ethernet ports: 2 (model R203-2); 1 (model R203)	
INPUT VOLTAGE	Voltage	up to 600 Vac, frequency 45 ÷ 65 Hz Minimum voltage 5 V (F.S. 150 Vac); 20 V (F.S. 600 Vac)
TA / TA (mV) ANALOGUE INPUTS	Current Input	Current input for CT: 1 ÷ 5 Full scale. voltage input (mV) for CT with voltage output or Rogowski: up to 333 mV full scale.
	Base prec. (*)	Network frequency: 50 ÷ 60 Hz. Voltmeter: 0.2 % Ammeter: 0.2%, wattmeter: 0.5%
(*) See the user manual for the error limits.		
ROGOWSKI ANALOGUE INPUT	Class / base prec. (*)	Network frequency: 50 ÷ 60 Hz. Voltmeter: 0.5 % Ammeter: 0.5%, wattmeter: 1 %
	Rogowski supplied by Seneca	• 100 mV correspond to 1000 A @ 50 Hz (sinusoidal) • 120 mV correspond to 1000 A @ 60 Hz (sinusoidal) Maximum measurable current: 3 kA @ 50 Hz; 2,5 kA @ 60 Hz Precision after calibration: ± 1 % (see chapter “Rogowski sensor”) Linearity: ± 0.2 %
(*) Accuracy is guaranteed in the ranges: CosΦ > 0.9;Vrms: 40 ÷ 600 Vac; Irms: 0.4 - 100% Rogowski current (error due to external Rogowski sensors excluded). See the user manual for the error limits.		
ANALOGUE OUTPUT	Voltage: 0÷ 10 Vdc, minimum load resistance: 2 kΩ Current: 0 ÷ 20 mA, 4 ÷ 20 mA, max. load resistance: 500Ω Transmission error: 0.1% of maximum field Response time: 1 s (10% ÷ 90%) Temperature drift: 100 ppm/K	
DIGITAL INPUT	For the technical specifications, see the electrical connection diagrams on page 5	
DIGITAL OUTPUT	For the technical specifications, see the electrical connection diagrams on page 5	
COUNTERS	Number of counters: 2 at 32 bits; maximum speed: 5KHz	
INSTALLATION CATEGORY	Category III (up to 600 V) in a direct connection	

ROGOWSKI SENSOR

The Rogowski sensor is a ring-shaped device designed for measuring AC, impulsive or complex waveforms.
For its correct use:
- wrap the ring on the conductor so that the arrow symbol shown in the ring is oriented in the same direction as the conductor current
- make sure that the connections are made correctly
- for a more precise measurement, the conductor cable must be placed in a central position with respect to the ring
- for a correct measurement, calibrate the Rogowski sensor by writing the calibration coefficient in the corresponding Modbus register (see the user manual).

Example: if the sensor is supplied with a characteristic of 90 mV / 1000 A, on the calibration register corresponding to the phase in which the Rogowski sensor is applied, the value to be set is: 1000 / (90 · 10).
NOTE ON ACCURACY: The product has a nominal accuracy of 0.5%. The total accuracy is the sum between the accuracy of the device and the accuracy of the Rogowski sensor connected to it.



DIP-SWITCH SETTINGS

⚠ WARNING

DIP-switch settings are only read during boot-up. A reboot is required for each change.

DIP-SWITCH SW1:

Via DIP-SWITCH-SW1, the IP configuration of the device can be set:

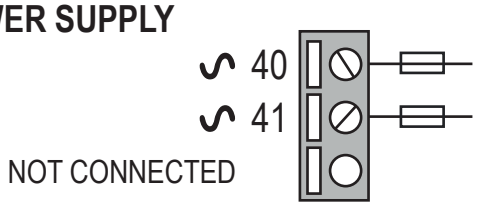
DESCRIPTION	DIP 1	DIP 2
To obtain the configuration from the flash memory, both DIP switches SW1 must be set to OFF		
To reset the device to factory settings both DIP SW1 must be set to ON		
To force the device IP address to the standard value for SENECA Ethernet products:192.168.90.101		
Reserved		

⚠ WARNING

DIP-SWITCHES are located on the back of the device.
To access the DIP-SWITCH, the bottom of the instrument must be removed.

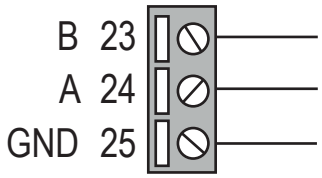
ELECTRICAL CONNECTIONS

POWER SUPPLY



The power supply is connected to terminals 40 and 41.
The supply voltage must be: 90 ÷ 264 Vac, 50 ÷ 60 Hz
It is advisable to insert a delayed 1 A fuse

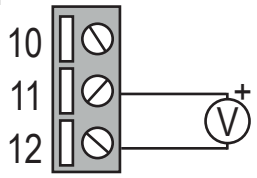
RS485



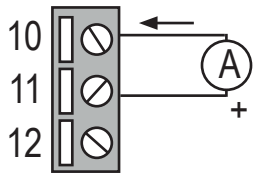
There is no isolation between RS485 and analogue output.

ANALOGUE OUTPUT

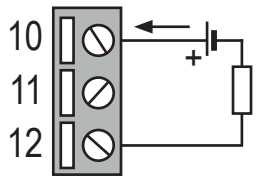
Voltage



Applied current

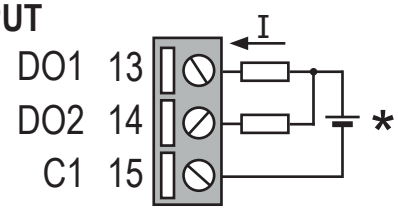


Supply current external



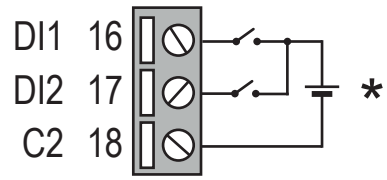
The device provides a voltage output (0 ÷ 10 Vdc) or programmable active or passive current (0 ÷ 20 mA).
For the electrical connections, screened cables are recommended.
There is no isolation between RS485 and retransmitted output.
It is necessary to program the outputs to use them correctly.

DIGITAL OUTPUT



The device has two digital outputs.
Capacity: Imax = 50 mA Vmax = 28V.
See the user manual for the functions.
*: Reversible polarity.

DIGITAL INPUT



The device is equipped with two digital inputs that can be activated with voltage from 12 to 24 V.
See the user manual for the functions.
*: Reversible polarity.

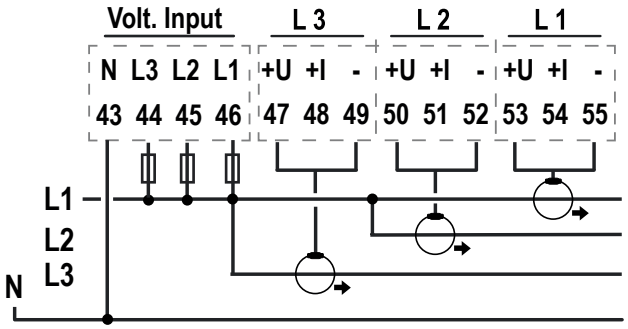
ELECTRICAL CONNECTIONS

⚠ CAUTION

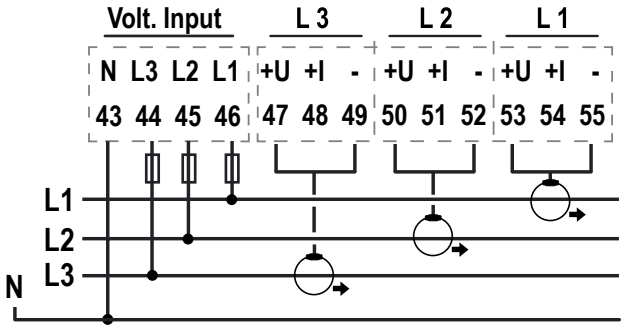
The installation of this appliance must only be carried out by qualified personnel.
Check that the device plate data (measurement voltage, auxiliary power supply voltage, measurement current, frequency) match the actual data of the network to which the instrument is connected. In the wiring, strictly observe the insertion diagram; inaccuracy in the connections inevitably causes false measurements or damage to the instrument.
Once the instrument is connected, complete the installation with the device configuration.
Grounding of the TA sensors is possible with negative cable connection.
Current measurement is only possible using current transformers.
It is advisable to insert a delayed 1 A fuse as shown in the diagrams below.

CONNECTIONS FOR ROGOWSKI SENSORS

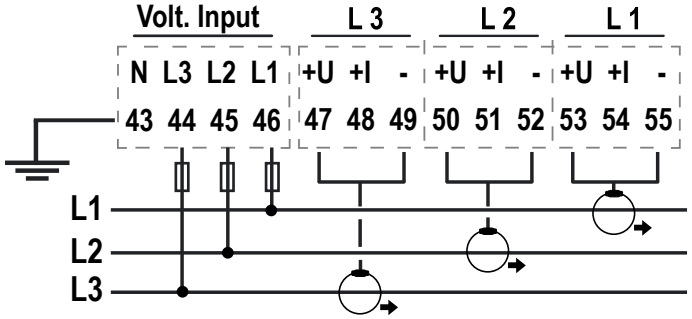
SINGLE-PHASE (with load division)



THREE-PHASE: 4 wires



THREE-PHASE: 3 wires

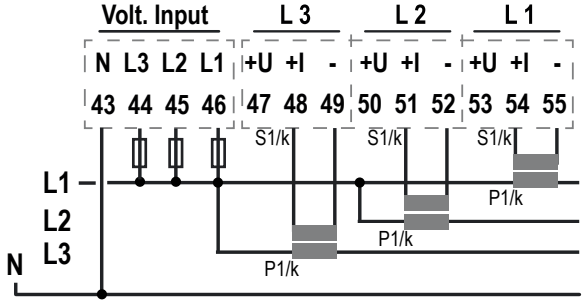


⚠ CAUTION

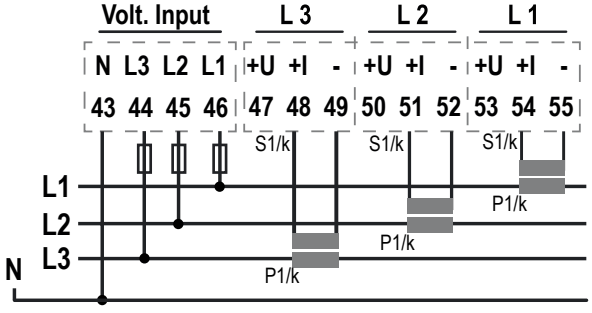
Rogowski sensor inputs are **non-inverted.**
Please refer to the Rogowski sensor manual for electrical connections.

CONNECTIONS FOR CURRENT OUTPUT TA

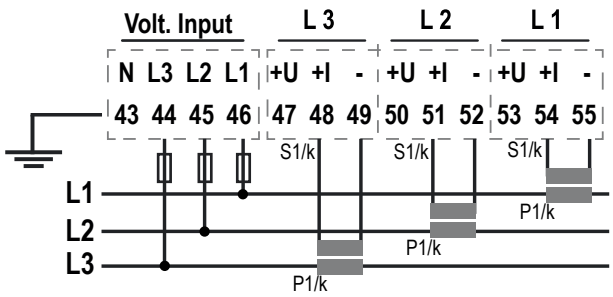
SINGLE-PHASE (with load division)



THREE-PHASE: 4 wires

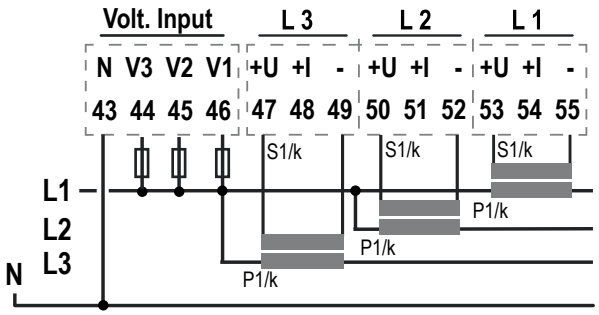


THREE-PHASE: 3 wires

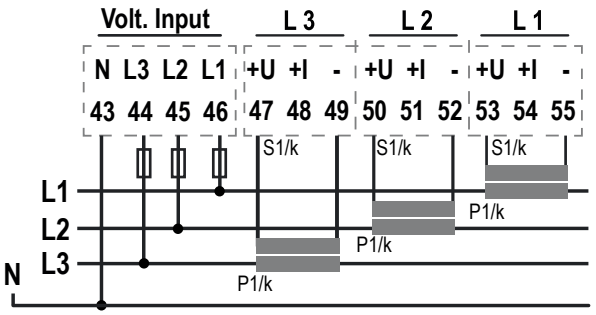


CONNECTIONS FOR VOLTAGE OUTPUT TA (mV)

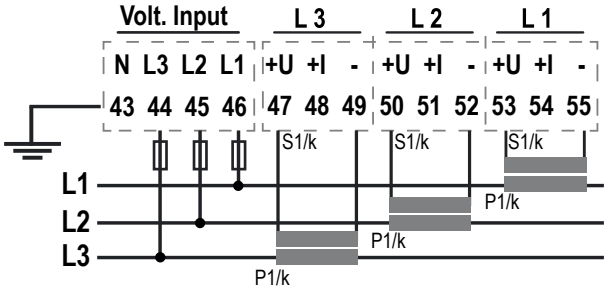
SINGLE-PHASE (with load division)



THREE-PHASE: 4 wires

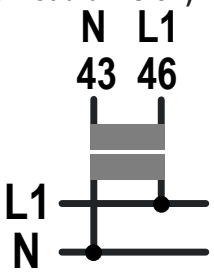


THREE-PHASE: 3 wires

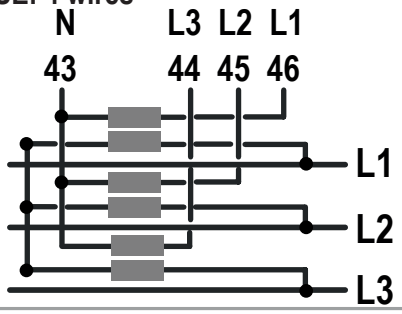


TV CONNECTIONS

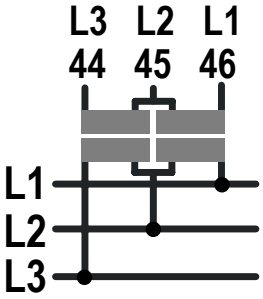
SINGLE-PHASE (with load division)



THREE-PHASE: 4 wires



THREE-PHASE: 3 wires



FACTORY IP ADDRESS

The default module IP address is static: 192. 168. 90. 101

WEB SERVER

To access the maintenance Web Server with the factory IP address above, use the following credentials:
Account User : admin; **Password** : admin / **Password Admin** : admin

⚠ CAUTION

DO NOT USE DEVICES WITH THE SAME IP ADDRESS IN THE SAME ETHERNET NETWORK.

ETHERNET CONNECTION RULES

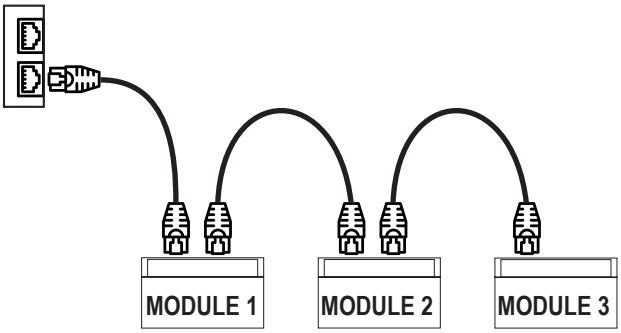
For the Ethernet cabling between the devices, the use of the shielded CAT5 or CAT5e cable is required.

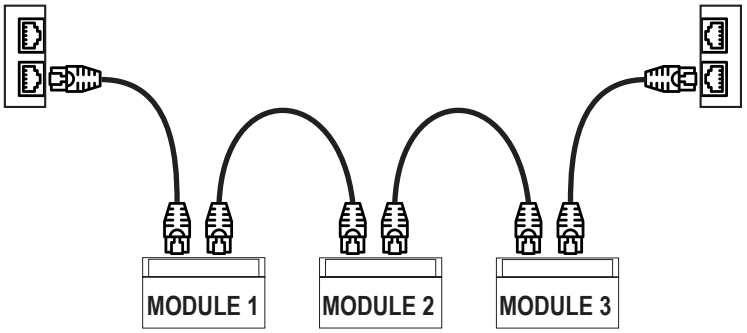
DAISY-CHAIN ETHERNET CONNECTION (DAISY-CHAIN) (ONLY R-203-2)

⚠ CAUTION

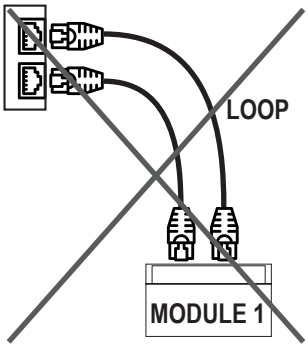
IT IS NOT ALLOWED TO CREATE LOOPS WITH ETHERNET CABLES

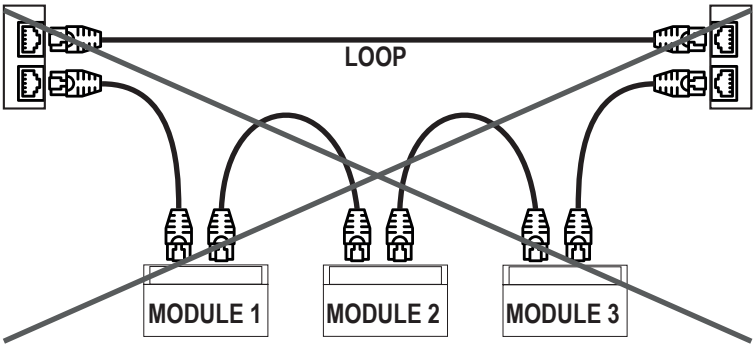
Using the daisy-chain connection it is not necessary to use switches to connect the devices.
The following examples show the correct connections.





There must be no loops in the Ethernet cabling, otherwise the communication will not work. The modules and switches must be connected eliminating any loops. The following examples show the incorrect connections.





The LAN fault-bypass function allows you to keep the connection between the two Ethernet ports of the device ON, in the event of a power failure. If a device turns off, the chain is not interrupted and the devices downstream of the switched-off one will still be accessible. This function has a limited duration: the connection remains active for a few days, typically 4. The fault-bypass function requires that the sum of the lengths of the two cables connected to the switched off module is less than 100m.